

**ABSTRACT**

A photovoltaic driven electrolytic water desalination process is disclosed herein. The process utilizes electrical energy provided by a photovoltaic device, such as a triple junction amorphous silicon solar cell, to induce a water splitting reaction in brackish water. The 5 photovoltaic device provides an electrical potential across an anode and a cathode in contact with the brackish water and the electrical potential induces the water splitting reaction. The water splitting reaction liberates oxygen gas and hydrogen gas from brackish water. Collection and subsequent recombination of the oxygen gas and hydrogen gas in a reaction chamber provides for the spontaneous formation of purer, non-brackish water. The recombination reaction of 10 oxygen gas and hydrogen gas to form water is an exothermic process that liberates energy in the form of thermal energy and/or electrical energy. The energy produced may be provided as power to other processes or used to supplement the photovoltaic energy used in the water splitting reaction. In another embodiment, the hydrogen gas and oxygen gas formed from brackish water may be separately collected and utilized without recombination to form water. The instant 15 invention thus provides a method for forming hydrogen gas from brackish water.